AIR CONDITIONING SYSTEM

The air conditioning system in the XC-132 airplane is divided into two systems. One system pressurizes, heats and cools the flight compartment while the other system heats and ventilates the cargo compartment. Both systems use air from a manifold that connects with the high pressure bleed ports on each of the four engines and the auxiliary power plant. As shown by the Ice Protection Control Schematic this manifold also supplies the pneumatic engine starters and the ice protection system.

Flight Compartment

As shown by the Air Conditioning System Schematic two turbines powered by the high pressure air bleed either from the main engines or the auxiliary power plant drive two superchargers that are operating in parallel. Air to pressurize the flight compartment enters a scoop in the forward section of the fuselage and passes through either of the superchargers since both will be operating normally. The superchargers cause the air temperature to increase as well as the pressure and if the flight compartment requires hot air the air flows directly into the distribution ducts. Warm air is provided by ducting the hot air through an air-to-air heat exchanger while cold air is provided by compressing the supercharger air further by another compressor then cooling it through the heat exchanger and expanding the air through a turbine. Downstream of the turbine, moisture from the air is collected in a water separator and discharged overboard. Power for the second stage compressor is supplied by the cooling turbine. The hot, warm, and cold air are normally controlled by a cabin thermostat; however, if necessary the valve position indicator located on the systems engineer's console may be used to manually set the mixing valves. A valve is provided to by-pass the second stage compressor when cold air is not required. Cooling air for the heat exchanger normally flows through the forward fuselage scoop; however, when the ram pressure is low or not available, such as on the ground, an electrically driven fan supplies air from the cargo compartment.

Air is distributed throughout the flight compartment by means of anemostats and radiant floor panels. Before being exhausted from the compartment all the air flows through the radio rack to cool the equipment. The pressure schedule is maintained by discharging air through a pressure regulating valve mounted on the floor.